Raychem ACS-30 Program Integrator

Utility for Circuit Parameter Upload and Download

USER MANUAL

Firmware versions
up to V7.0.X

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Section 1 Introduction

1.1 Welcome

This manual provides instructions for the use of the Raychem ACS-30 Program Integrator utility software. The ACS-30 Program Integrator is a utility used on Microsoft® Windows PCs that allows the user to easily set up ACS-30 circuit databases with the comfort of a larger display and a keyboard as an input device. The Program Integrator is also able to transmit and receive circuit databases to and from the UIT2, making it simple to create, backup, and modify ACS-30 circuit databases.

1.2 User Responsibilities

The performance, reliability and safety of your Pentair Thermal Management heating cable system depends on proper design, selection and installation. The Raychem ACS-30 Program Integrator Utility will help you configure and update ACS-30 circuit databases, but it is only a tool. It assumes that your input is accurate and that you will ensure that the uploaded configuration of the heating cable system is installed, maintained and used as intended. The ACS-30 Program Integrator Utility should be used under supervision of a knowledgeable engineer to ensure it is used appropriately.

The ACS-30 Program Integrator must be used in conjunction with the ACS-30 Programming Guide (H58279 or H58692 for use ACS-UIT2) and the appropriate Pentair Thermal Management heating cable application design guide that pertains to your particular application.

1.3 Safety Warnings

There are important safety warnings shipped with Pentair Thermal Management' products and printed in the supporting literature. Be sure to read and follow them to reduce the risk of fire, shock or personal injury. If you have any questions, contact your local representative or Pentair Thermal Management directly.

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1.5 Technical Support

For technical support, contact your local Pentair Thermal Management Representative or technical support group at:

Tel (800) 545-6258

Tel (650) 216-1526

thermal.info@pentair.com

1.6 System Requirements

The following equipment will be necessary to use the ACS-30 Program Integrator:

- A Pentium® III – 500MHz or faster (Recommended), Pentium II – 300 MHz (Minimum) IBM compatible personal computer
- A hard disk with at least 1 Megabyte of free space
- 256 MB of RAM (Recommended), 128 MB of RAM (Minimum)
- A mouse or other compatible pointing device
- Screen resolution of at least 800 x 600
- Microsoft Windows Vista, Windows XP Pro, Windows XP Home, or Windows 2000
- .NET Framework version 2.5
- RS-232/485 Connectivity or Ethernet using a crossover cable

Optional:

- USB Flash Drive: 128 MB, USB 1.1 or higher.
- USB Port supporting USB 1.1 or higher

Section 2 ACS-30 Program Integrator Utility

2.1 Basic Assumptions

This user guide assumes that the user is familiar with the Microsoft Windows environment. This includes the knowledge of how to launch an application, manipulate files, use menus and window boxes, and using a mouse or other comparable pointing device.

2.2 Installing ACS-30 Program Integrator

1. Double-click Setup.exe to run the ACS-30 Program Integrator installation.
2. Follow the steps on the screen to complete installation.

2.3 Starting the ACS-30 Program Integrator

After installation, a shortcut will be created both on the desktop and in the Start Menu. To start the program, either double-click the icon on the desktop or click Start > Programs > Pentair Thermal Management > ACS-30 Program Integrator > ACS-30 Program integrator.

The program will launch with an empty database file. To open an existing database, click File > Open. An ACS-30 database is stored as an Extensible Markup Language (XML) file which consists of a list of circuits and all of their parameters as seen on the ACS-UIT2.

2.4 Menu Bar

The menu bar options are organized for creating and opening databases, uploading and downloading databases to and from the ACS-30-UIT2, printing database reports, and other useful functions.

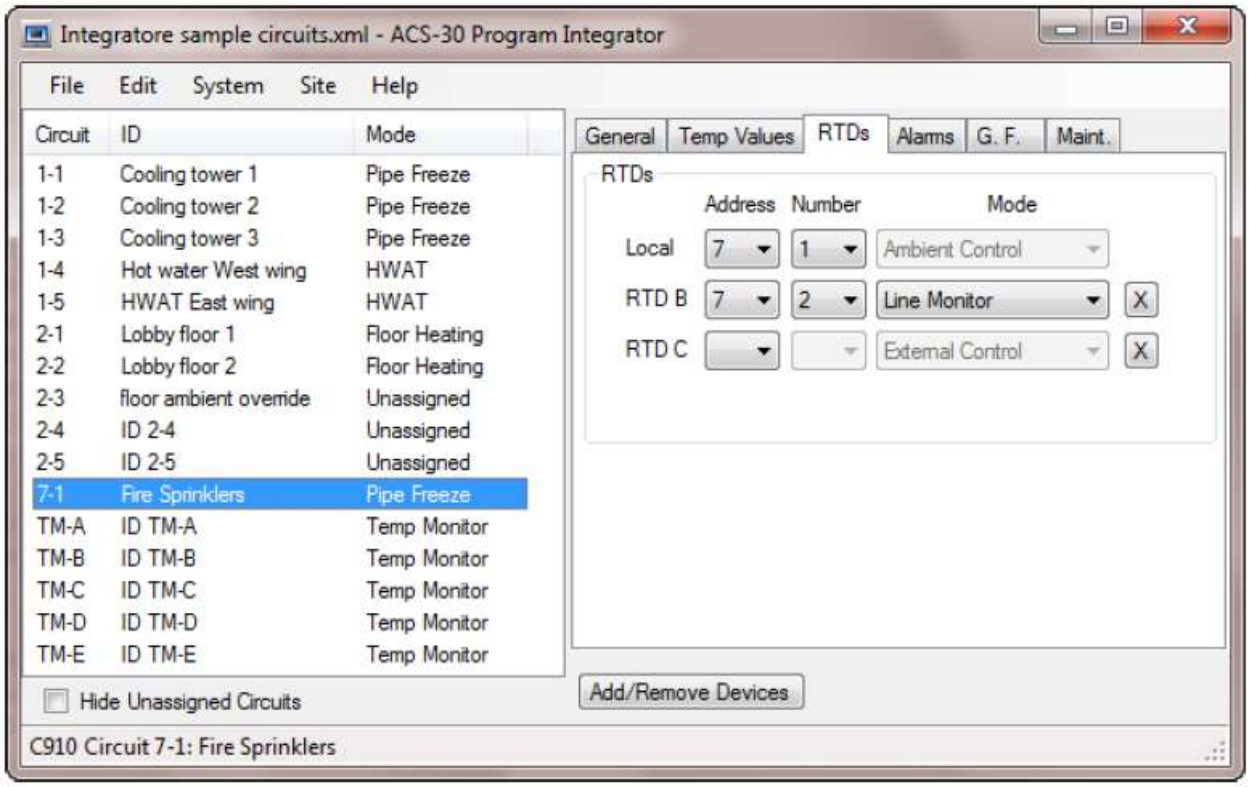


Figure 1 Main Window: Menu Bar

2.4.1 FILE

This menu allows you to open, save, and create new database files. Other functions include transmitting or receiving data from the ACS-30-UIT2 and printing database reports.

New – Clicking this option clears the current database and lets you start with a brand new blank circuit database.

Open – This option will launch the Open File window which will allow you to choose an existing database to view and edit.

Save – This option will save the current database if it is being modified. If the database is new and has never been saved before, clicking on this option will launch the Save File As window.

Save As – This option will save the current database allowing you to select location and rename the file.

Import and Export... – This option will launch the Import and Export utility to send and receive databases to and from the ACS-30-UIT2. This topic will be discussed in detail in Section 6.

Page Setup – This option allows you to adjust paper size and orientation.

Print Preview – This option will show you a preview of the printed system circuit summary report before printing it.

Print– This option will launch the Print window allowing you to select the printer and adjust the printer settings before the system circuit summary is sent to the printer.

Exit – This option will terminate the ACS-30 Program Integrator.

2.4.2 EDIT

This menu gives you the option to do basic copy and pasting, along with other functions which include editing the Device List.

Copy – This function places the current circuit in the clipboard which can then be pasted onto any unassigned circuit.

Paste – This function pastes all of the parameters of the circuit on the clipboard (except RTDs and ID) into any unassigned circuit selected on the Circuit List panel.

Unassign – Clicking this option will unassign each selected circuit on the Circuit List panel.

Select All – Clicking this option will select all Circuits in the Circuit List panel.

Devices – This function launches the Device List where you can add, edit or remove devices from the list.

2.4.3 SYSTEM

Temp Units – This menu allows you to choose which temperature units will be displayed in the program. A check mark will be placed adjacent to the active temperature unit.

Stagger Start – will sequentially power the circuits in each ACS-PCM-5 to reduce the overall load during start-up.

2.4.4 SITE

This menu allows you to edit the Site Documentation. Clicking on Documentation under this menu will launch the Site Documentation window where information such as the site supervisor and contact numbers can be placed.

2.4.5 HELP

This menu contains the version information for the ACS-30 Program Integrator and a hyper link to the ACS-30 product page containing this user manual. For further information and all the ACS-30 literature please go to: www.thermal.pentair.com.

Section 3 Creating the ACS-30 Circuit Database

This section will go through the process to set up the heating cable system parameters and build the ACS-30 database. You should have a summary of the heating cable system design available to enable you to input the control parameters. Consult the ACS-30 Programming Guide (H58279 or H58692 for use ACS-UIT2) and the appropriate heating cable application design guide in setting up these parameters.

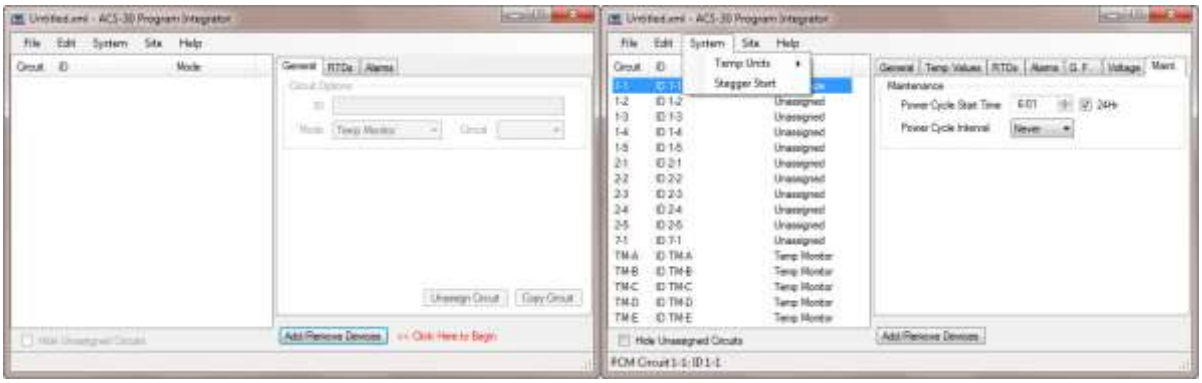


Figure 2 Main Window and Circuit Parameter tabs: With and without circuits assigned.

The main window consists of a Circuit List to the left, and the Circuit Parameters on the right. Clicking on a Circuit on the Circuit List will bring up the parameters of that circuit into the tabs on the right.

Below the Circuit List is a checkbox allowing you to hide the circuits whose Control Mode is set to Unassigned. This will make it easier to work with active Circuits.

Below the Parameter tabs is a button labeled "Add/Remove Devices," which is a shortcut to the same Device List under Edit | Devices. This will launch a window box allowing you to edit the device in this ACS-30 setup. If no circuits have been assigned to the system "Start here" is displayed to the right of the Add/Remove Device button.

3.1 Add/Remove Devices

This window allows you to create or edit the device list. Devices must be added to the list before heating cable circuit parameters can be set-up in the program.

1. Click on the Add/Remove Devices button on the main window.
2. The Device List will appear. Click on the Add button.

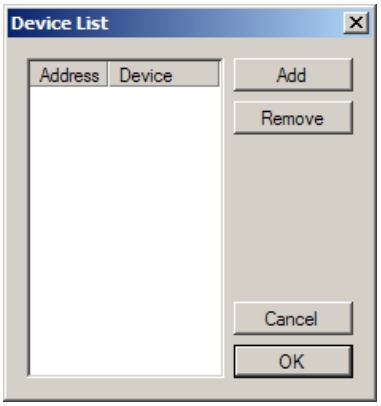


Figure 3 Device List

3. The Add Device window appears

Figure 4 Add Device Window

Device: This window allows you to set the device type:

CRM: The ACS-PCM-5 power control panel

C910: A single circuit C910 controller

RMM2: The remote temperature monitoring module.

Device Address: The following table lists the device addresses available for the devices:

Table 2.1 Available Device Addresses

Device	Device Type	Switch setting	Device address
ACS-CRM	Relay Output/RTD	1-99	1-99
C910	Relay Output/RTD	1-99	1-99
RMM2	RTD	0-9	32-41
RMM2	RTD	A-F	42-47

Select a Device and a Device Address then press OK to add this device and address to the list.

Figure 5 Device List with a PCM panel, C910-485 controller and a RMM2 temp module

4. Repeat as necessary to add additional devices
5. Click OK to finish

3.2 Parameter Tabs

The Parameter Tabs are the heart of the program. All circuit settings can be configured with these tabs. All the heating cable application modes and ACS-30 control parameters are described in the ACS-30 Programming Guide (H58279 or H58692 for use ACS-UIT2).

3.2.1 GENERAL TAB

The General Tab is where all general settings reside.

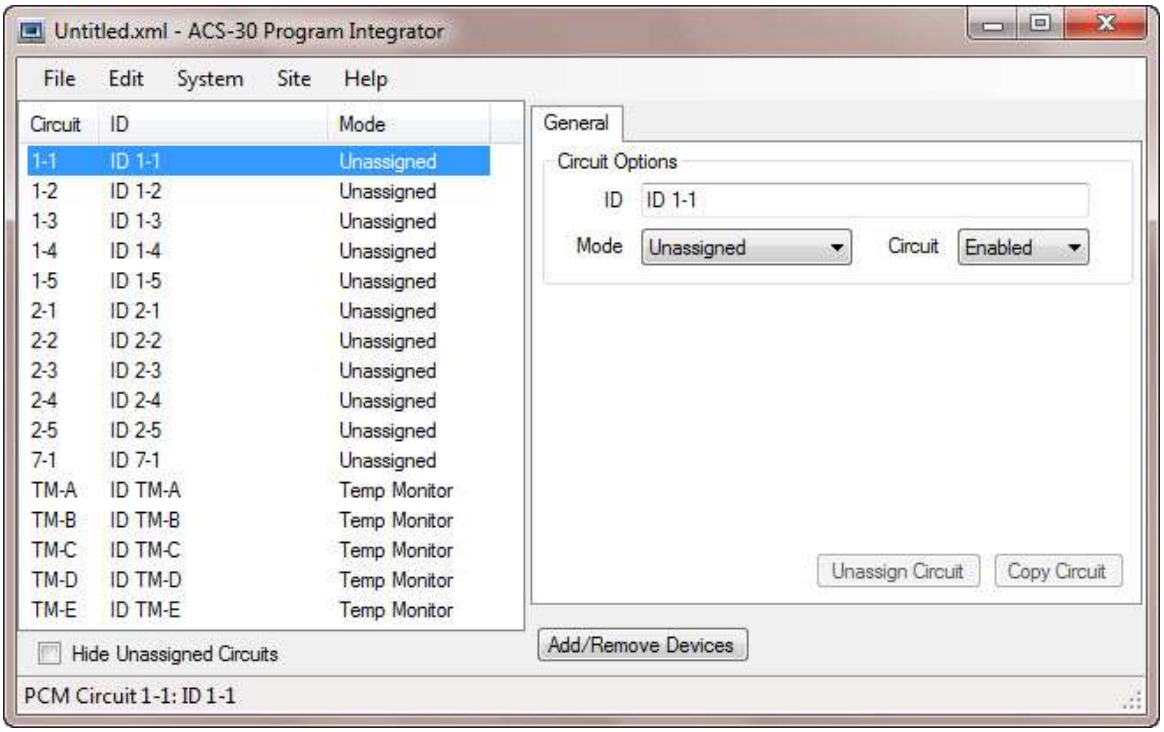


Figure 6 General Tab

ID – This is the name assigned to the circuit for easy identification. A 40 character limit is placed on this field.

Mode – Clicking this will drop down a list of available heating cable application Control Modes for the ACS-30. The available control modes include:

Unassign: Clears all circuit parameters
HWAT: Hot Water Temperature Maintenance application

Cable type

Voltage

Pipe type

Ambient temperature

Power factor

Frost Heave: Freezer Frost Heave Prevention application
Floor Heating: Floor Heating application
Pipe Freeze: Pipe Freeze Protection application
Fuel Oil: Fuel Oil Flow Maintenance application

Greasy Waste/FM: Greasy Waste and other flow maintenance applications with a temperature setpoint above 70 F.
Roof & Gutter: Roof and gutter de-icing

- Ambient Control
- Surface Temp control
- External Device Control

Snow Melting: Surface snow melting

- Ambient Control
- Surface Temp control
- External Device Control

Temp Monitor: The mode assigns up to four RTDs to monitor a critical point and set high/low temperature alarms. No circuit relays are associated with this position

Note:

Changing control modes will enable and disable different options depending on which parameters are needed for that mode. Changing from one mode to another will result in the loss of any previously entered data as the default values are loaded.

Enabled Checkbox – This indicates if the circuit should be enabled or disabled.

Copy Circuit – This button launches the Copy Circuit utility that is similar to the one on the ACS-UIT2. This can be used instead of the Edit > Copy method in the menu bar.

Unassign Circuit – Clicking on this button will unassign the current circuit. This has the same effect as changing the Mode to Unassigned.

Temperature Control options – Once an application control mode is selected the temperature control method can be set to Ambient, Line Sensing or PASC depending upon the application.

3.2.2 TEMP VALUES TAB

Clicking this tab shows the data entry fields for all of the temperature parameters.

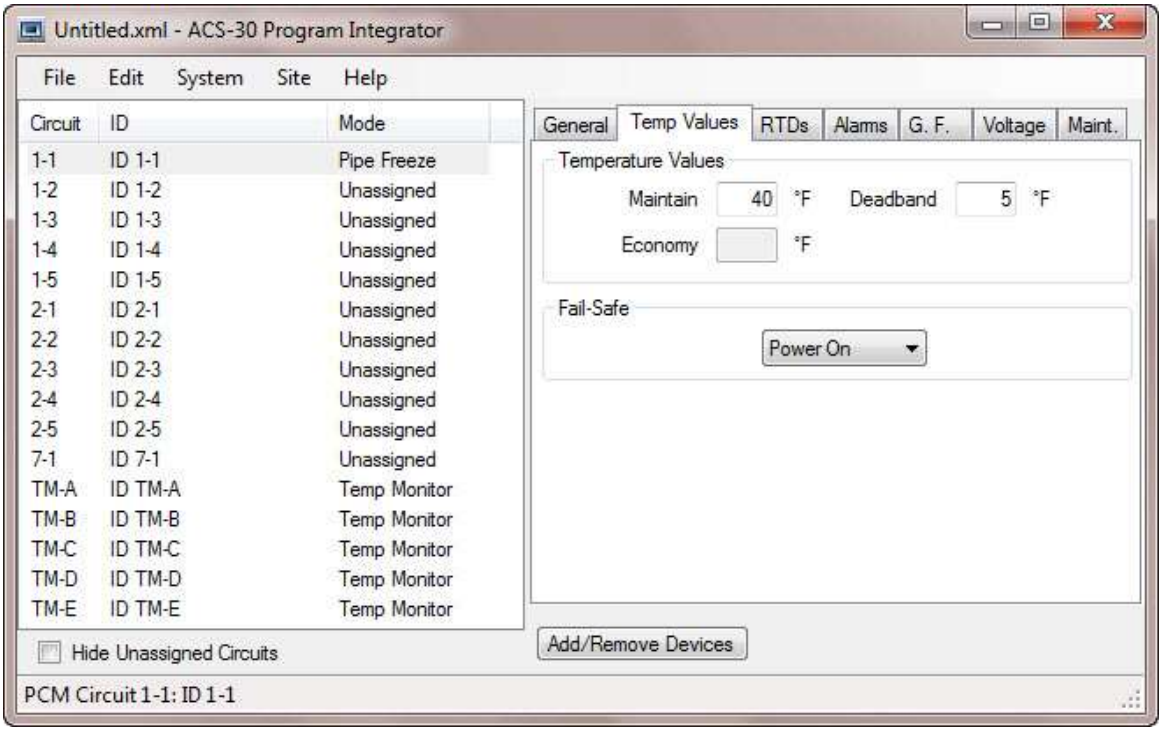


Fig 7 Temp Values Tab

Maintain – The setpoint temperature of the circuit. This value can be changed in all Control Modes unless the Temperature Control is set to PASC, where in this case it will be fixed at 40ºF.

Economy – The economy temperature is the secondary setpoint temperature used in circuits who's Control Modes is set to HWAT, Floor Heating or Greasy Waste. This input is only disabled if the previous case is true and the Setpoint Mode is set to Variable (see below).

Deadband – The control temperature deadband of the circuit control.

Fail-Safe – The fail-safe mode is used if the control temperature can't be derived from the RTD inputs. If all control RTDs on a given circuit fails, the relay state will be changed to what the fail-safe mode is set to.

Setpoint Mode – Setting this to constant automatically creates a schedule that is constantly using the Maintain temperature as the setpoint. Changing this to variable will allow you to edit the schedule by clicking the Schedule button.

Schedule Button – Clicking on this button will launch the 24/7 Scheduler. See Section 3.2.8 for more information on this utility.

PASC Parameters:

Min Ambient – The minimum design temperature for the piping application.

Min Pipe Size – The minimum pipe diameter for the application used to adjust the duty cycle time.

Power Adjust – Used to adjust the pipe maintain temperature for the application.

3.2.3 RTDS TAB

Clicking this tab opens the RTD address and mode data input fields. Up to four RTDs can be assigned to the circuit. Depending on the Temperature Control mode, RTDs can also be set as a controlling RTD or as a passive monitoring RTD.

When external control mode is selected the output of the snow controller is assigned in the RTD tab. Only one external control may be selected for circuit.

Clicking on the X button clears the address and the number fields for the RTD.

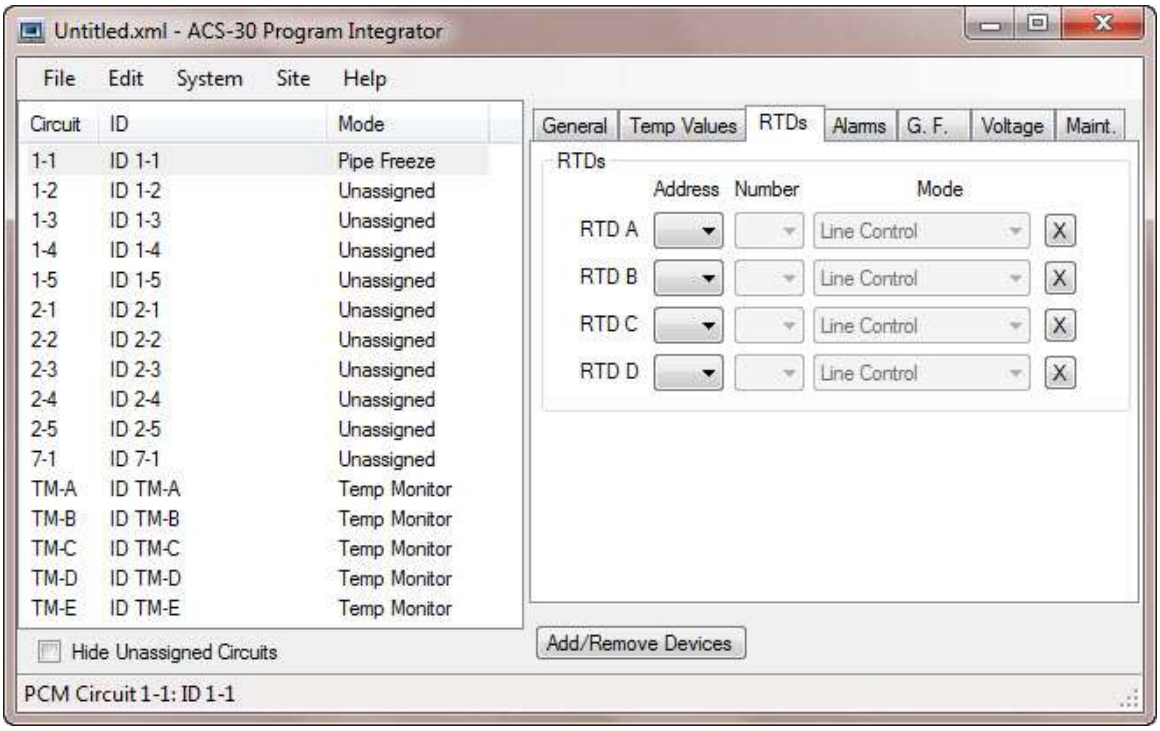


Figure 8 RTDs Tab

3.2.4 ALARMS TAB

Clicking this tab displays the input fields for the temperature alarm values. It is only accessible if at least one RTD is directly measuring the temperature of the pipe (either Line Control or Line Monitoring).

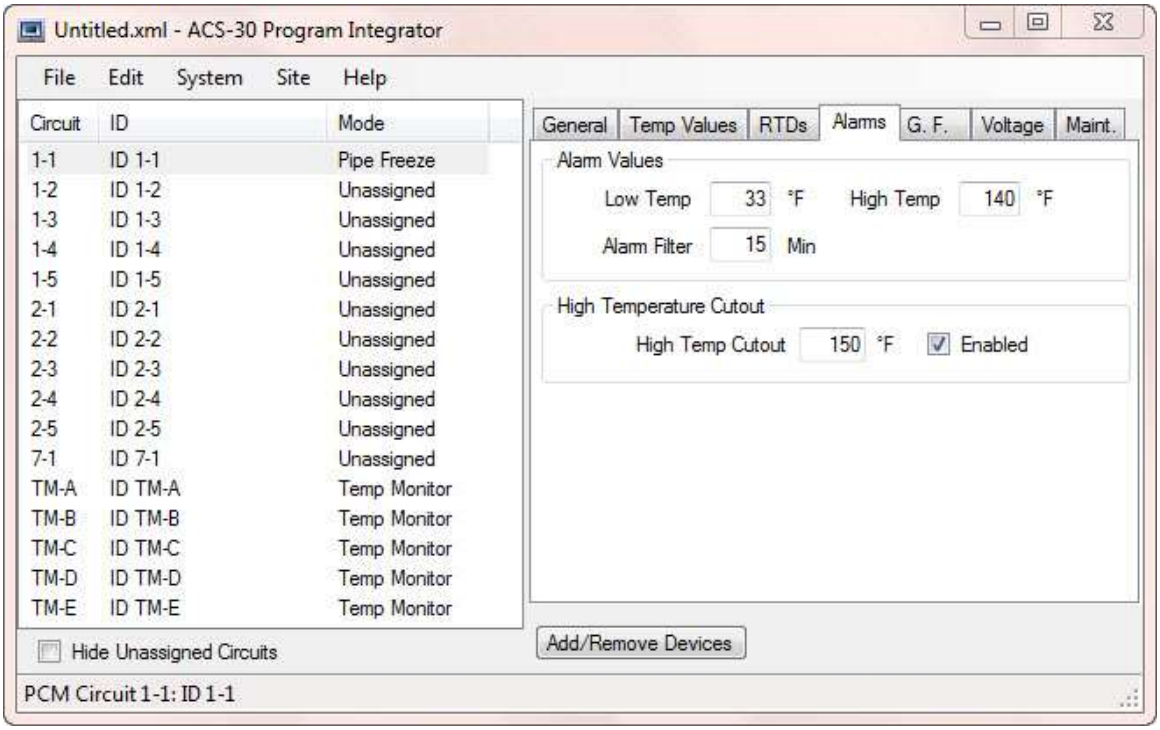


Figure 9 Alarms Tab

Low Temp – An alarm condition will occur if the line RTD is below this value.

High Temp – An alarm condition will occur if the line RTD is above this value.

Alarm Filter – The time an alarm condition must constantly be in before an actual alarm occurs.

High Temp Cutout – If any line RTD exceeds this value, the heating cable for that circuit will automatically turn off. If the temperature falls below this value again, the heating cable will turn back on.

High Temp Cutout Enabled – Indicates if High Temp Cutout is enabled.

3.2.5 GROUND FAULT TAB

This window provides windows to set levels for ground-fault alarm and trip.

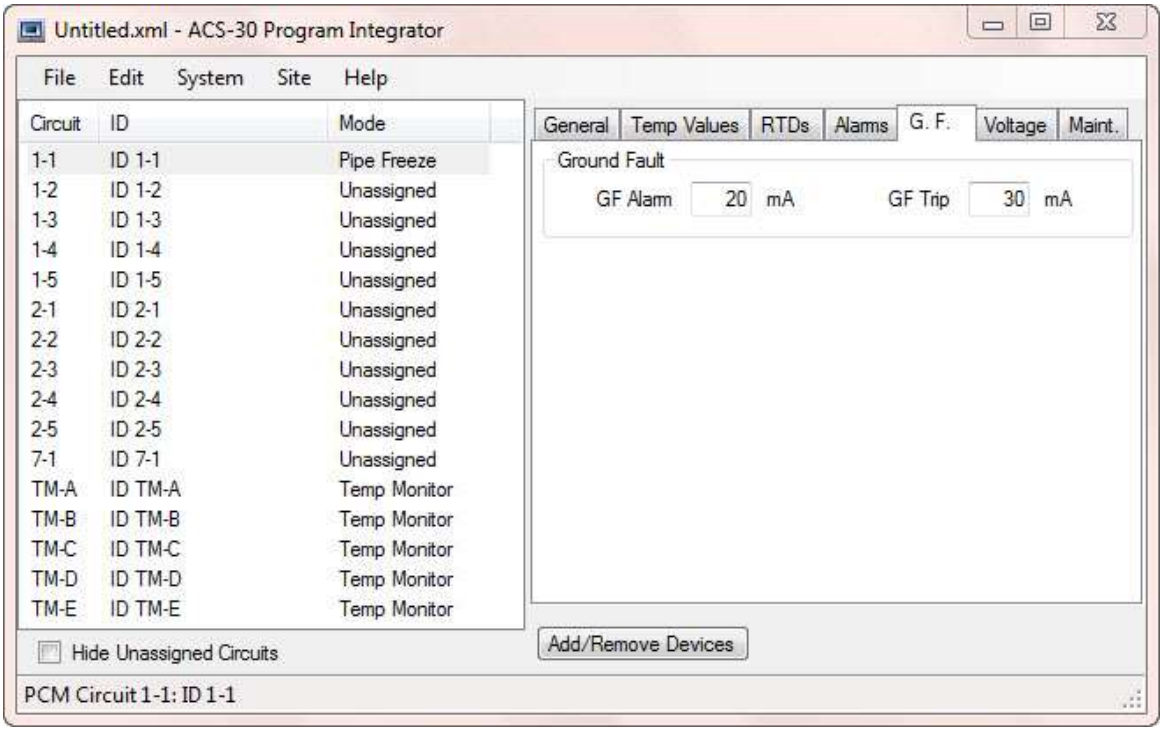


Figure 10 Ground Fault Tab

GF Alarm – An alarm condition will occur if the ground fault reading exceeds this value.

GF Trip – An alarm condition will occur and the heating cable will turn off if the ground fault reading exceeds this value.

3.2.6 VOLTAGE TAB

This window provides a window to enter the system voltage used to monitor the energy used by the circuit. Supply voltages from 120 to 277 V used are with the standard ACS-PCM2-5 panels. Custom panels are required for 480 V and 600 V.

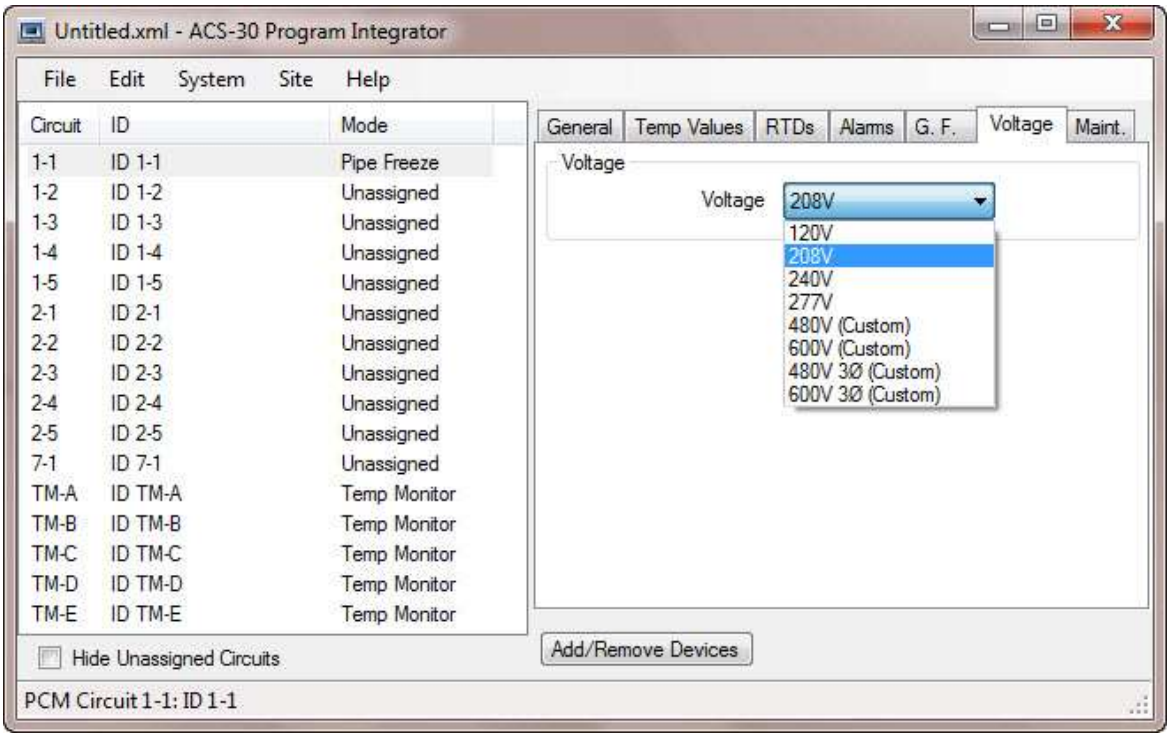


Figure 11 Voltage Tab

3.2.7 MAINTENANCE TAB

This window allows you to engage the "Power Cycle Test" at a specified time and interval. This feature powers a circuit for two minutes to ensure it is operational.

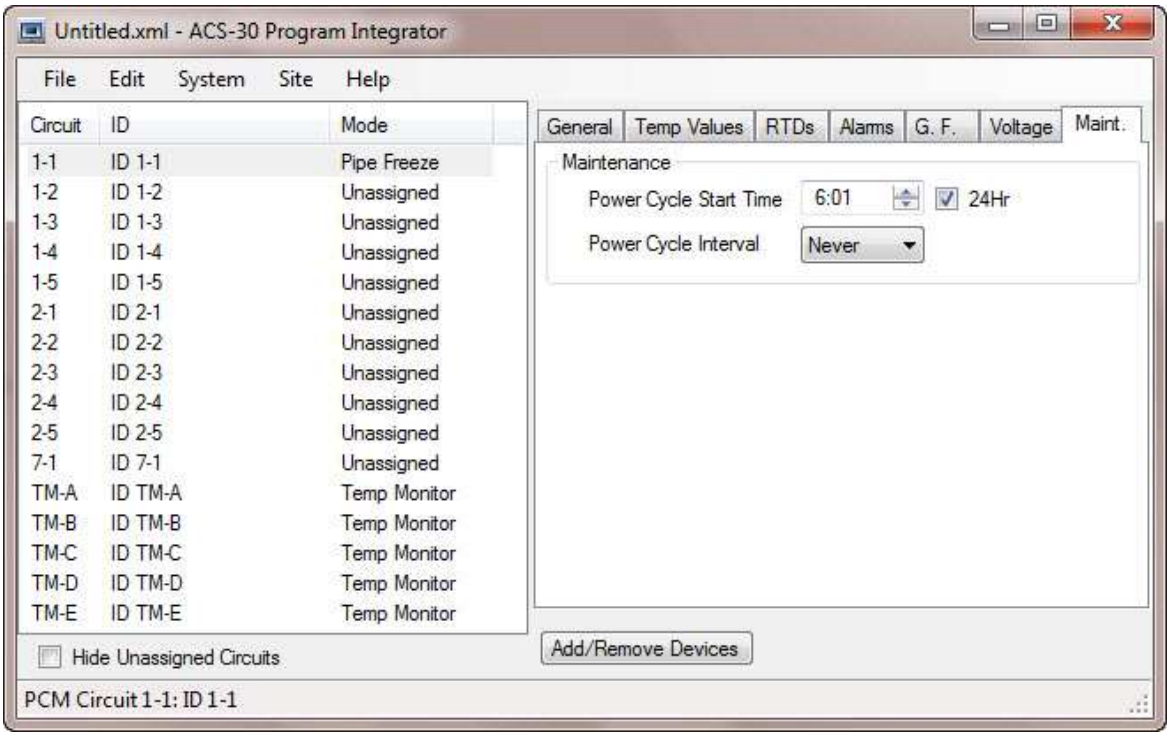


Figure 12 Maint. Tab

3.2.8 THE 24/7 SCHEDULER

The 24/7 Scheduler is used to program variable temperature setpoints at specific times during the week for HWAT, Freezer Frost Heave (with ACS-UIT2), Floor Heating and Greasy Waste heating applications. The 24/7 Scheduler has the following setpoints:

Maintain: The main design temperature for an application
Economy: A set back temperature for energy savings.
Off: Used to save additional energy
Heat Cycle: Used to rapidly increase pipe temperatures (only for HWAT-R2 heating cables).

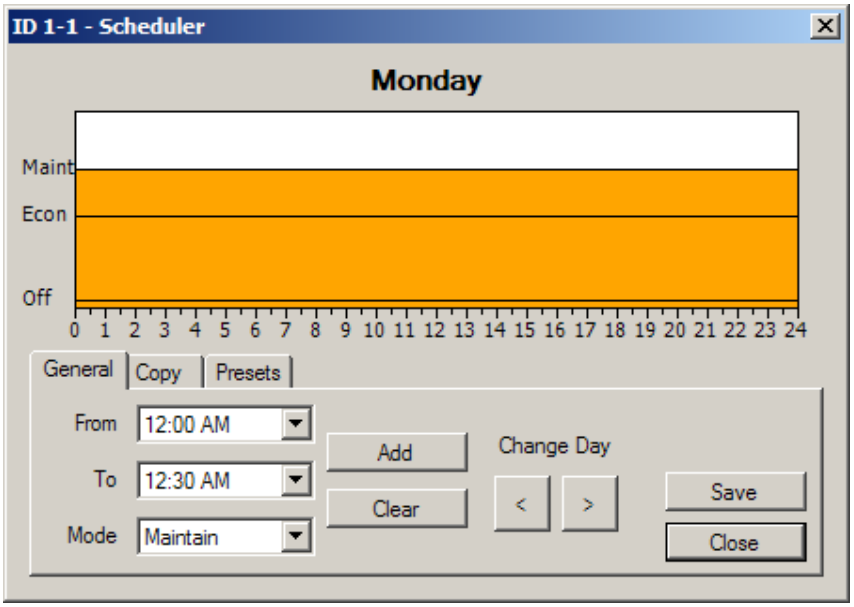


Figure 13 Main 24/7 Scheduler Window

Scheduler Graph - The schedule is represented by a colored bar graph. The time of day is labeled across the bottom in 24 hour format starting at 0 (12:00am) and ending at 24 (12:00am). Each intermediate tick mark represents a half-hour in time. Each temperature setpoint is represented by both the height and color of the bar. The mode colors are described below:

Maintain:	Orange
Economy:	Green
Off:	Blue
Heat-Cycle:	Red (HWAT-R2 only)

The main screen of the Scheduler displays all of the data input fields needed to create a schedule. All of the functions are described below.

3.2.9 GENERAL TAB

The General tab allows you to create a schedule to match the weekly use pattern of the heating application.

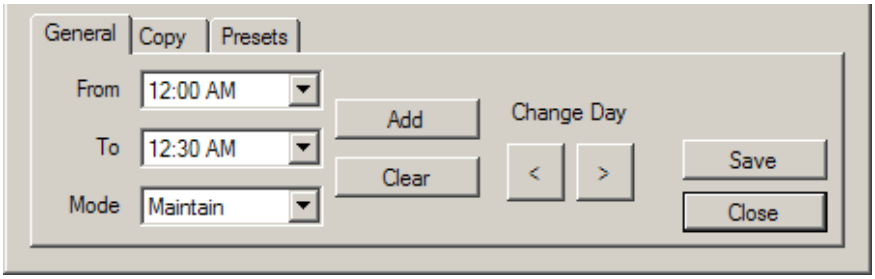


Figure 14 General Tab

Scheduler Dropdown Boxes - The dropdown boxes labeled "From", "To", and "Mode" are used to configure the schedule. A more detailed procedure on how to do this is described in the Section 3.2.6.4.

Add Button The add button deciphers what is configured in the Scheduler dropdown boxes and places it into the schedule. See Section 3.2.6.4 below for more information.

Clear Button Clicking on this button will clear the entire schedule. This will set every day of the week to act in Maintain mode. This would be synonymous to setting the Setpoint Mode to Constant.

Change Day Buttons Pressing the < button will navigate you to the day prior to the one that is currently being displayed. Conversely, pressing the > Button will advance you to the next day.

Save Button Saves the changes on the current schedule.

Close Button Exits the Scheduler. If the schedule changed and was not saved, the Scheduler will prompt you asking if you want to save the changes that were made before exiting.

3.2.10 COPY TAB

This tab allows you to copy the current day being displayed to any other day(s) in the schedule. To do this, place a check mark next to each day that you wish to copy to and press the Copy button.

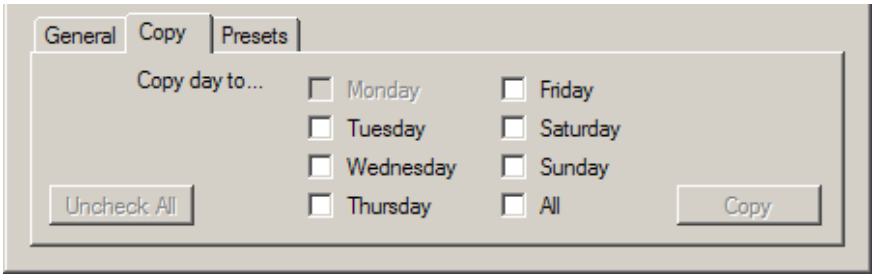


Figure 15 Copy Tab

To cancel at any time, click on the General tab and click the Close button.

3.2.11 PRESETS TAB

When using the Scheduler for an HWAT circuit, the presets option will appear on the main screen. Clicking on this tab will bring you to the presets configuration screen where you can choose out of a list of common presets. After choosing a preset, they can be modified to fit your specific needs.

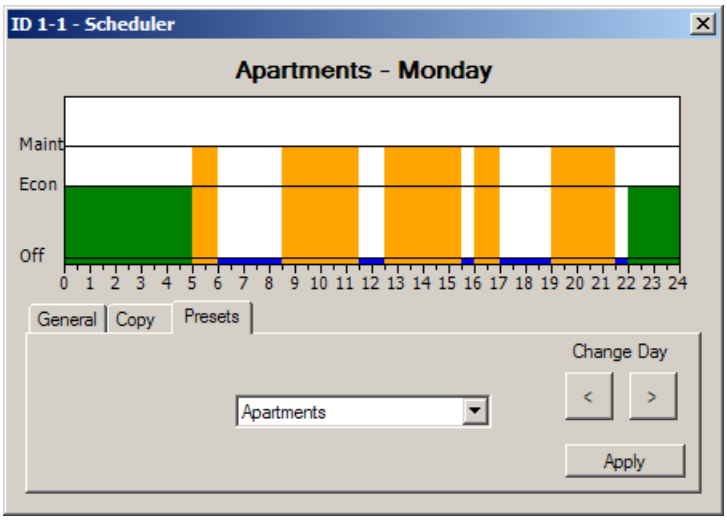


Figure 16 Presets Window

Presets Dropdown Box Click on the drop down box to view the list of presets available. Selecting a preset will temporarily display it on the Scheduler Graph.

OK Button Clicking on the OK button will prompt you asking if you would like to overwrite the original schedule with the new preset schedule. After a decision is made, you will be brought back to the main General tab.

Change Day Buttons As with the General tab, clicking on these buttons will navigate you throughout the week.

3.2.12 CONFIGURING A SCHEDULE

A schedule can be configured into 48 discrete 30-minute intervals per a 7-day week where each day can be unique.

To schedule a block of time to a specific mode:

1. Select the start time from the "From" drop-down menu.

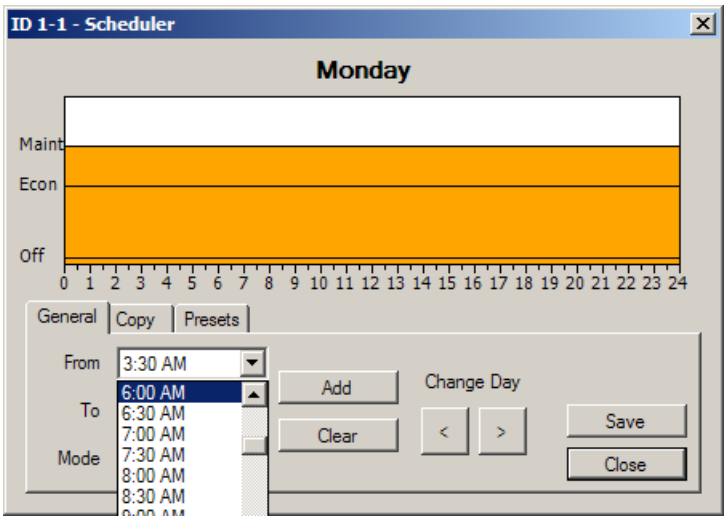


Figure 17 Selecting Start Time

2. Select the end time from the "To" drop-down menu.

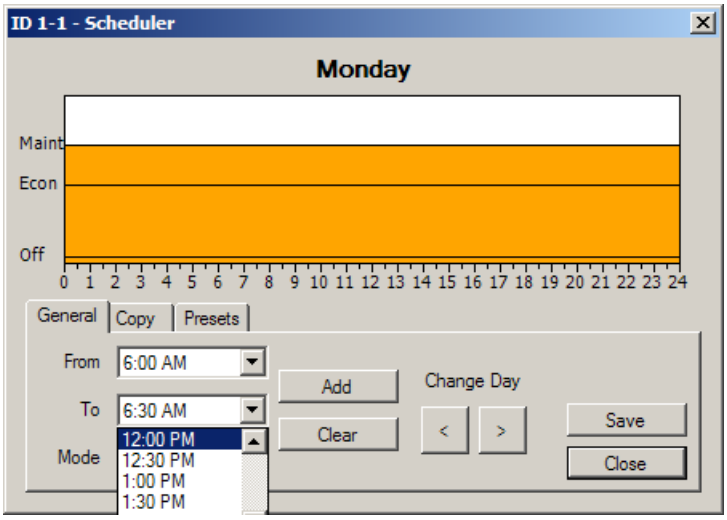


Figure 18 Selecting End Time

3. Select the mode from the "Mode" drop-down menu.

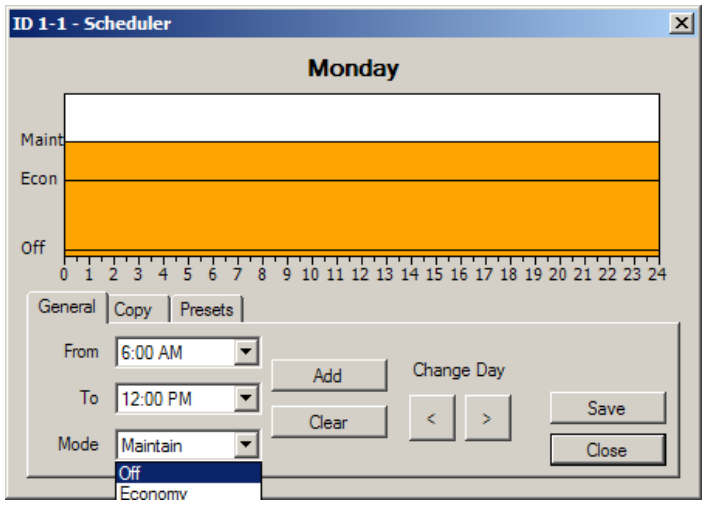


Figure 19 Selecting Setpoint Mode

4. Tap on the "Add" button.

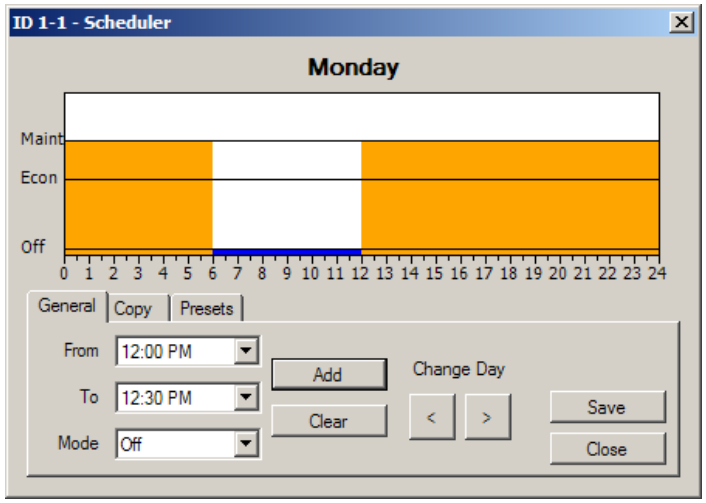


Figure 20 Time Segment Added to Graph

5. Repeat as necessary
6. Click Save
7. Click Close

Section 4 Printing Circuit Summary

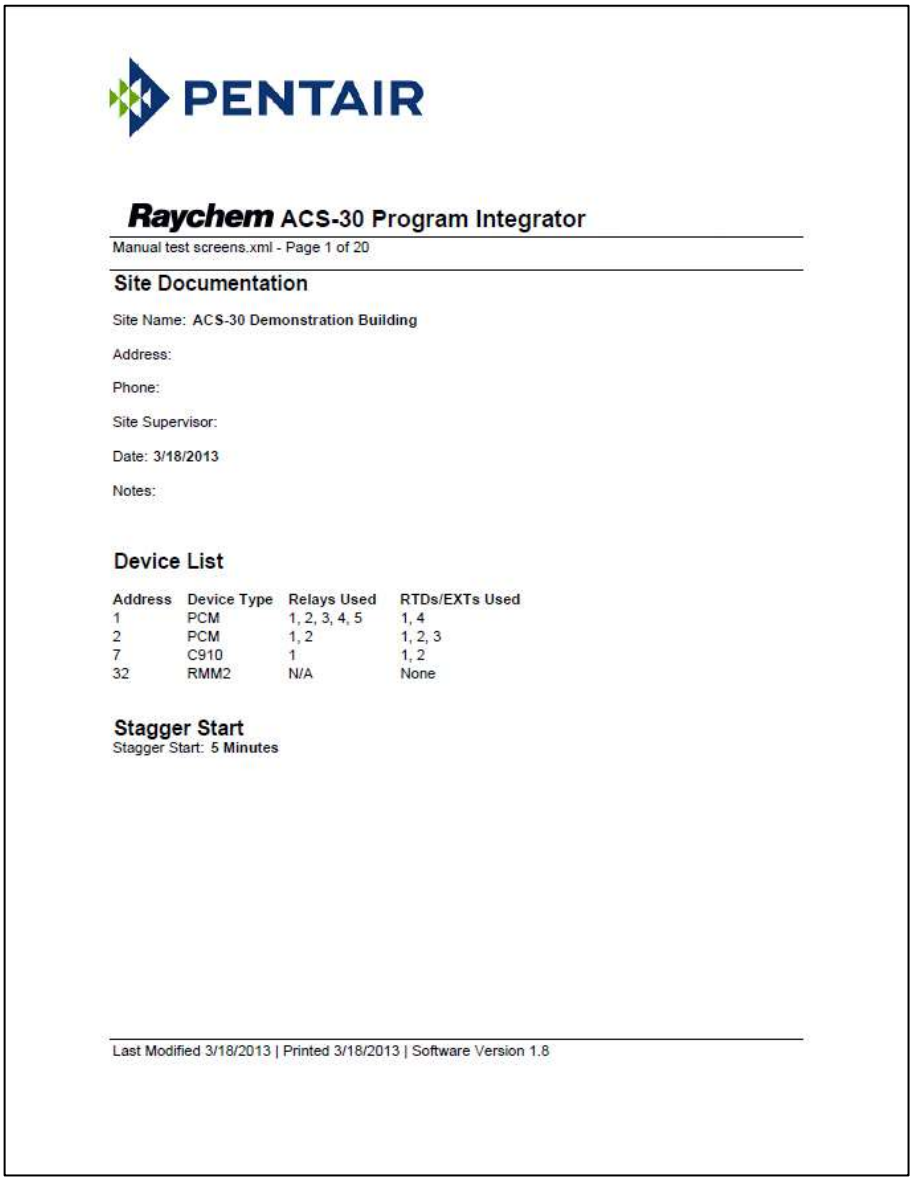
Once the ACS-30 system circuit database has been created, a summary of the database can be printed for site records and to assist in the heating cable commissioning. The printout is divided into several sections:

Job Site: The job site name, address and contact information can be entered when you click the SITE main menu bar.

Device List: Summarizes all devices added to the system.

Circuit List Summary: Lists all circuits with circuit number, circuit ID, Control mode, and assigned RTDs.

Individual Circuit Parameter List: Lists all control parameters for each circuit.



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Raychem ACS-30 Program Integrator

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Site Documentation

Site Name: **ACS-30 Demonstration Building**

Address:

Phone:

Site Supervisor:

Date: **3/18/2013**

Notes:

Device List

Address	Device Type	Relays Used	RTDs/EXTs Used
1	PCM	1, 2, 3, 4, 5	1, 4
2	PCM	1, 2	1, 2, 3
7	C910	1	1, 2
32	RMM2	N/A	None

Stagger Start

Stagger Start: **5 Minutes**

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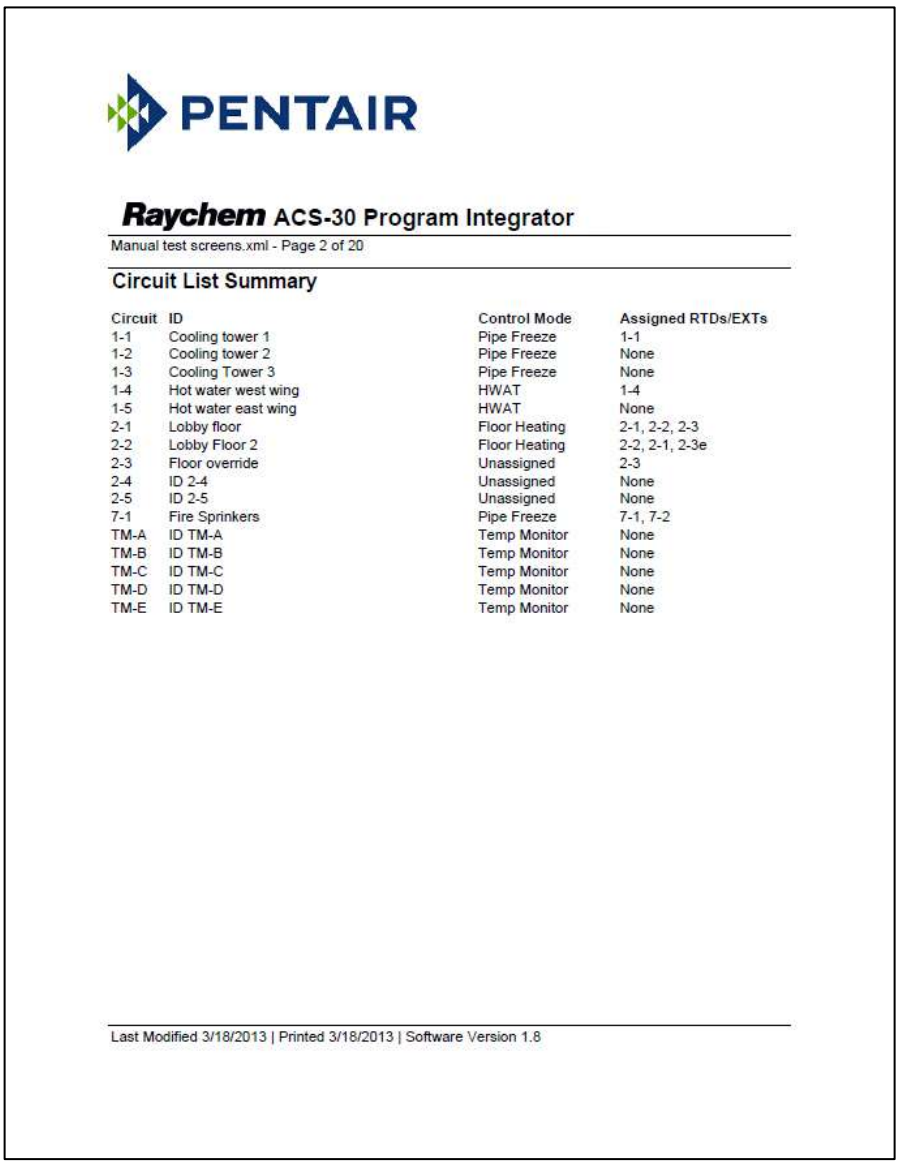
Figure 21 Example Print-Out



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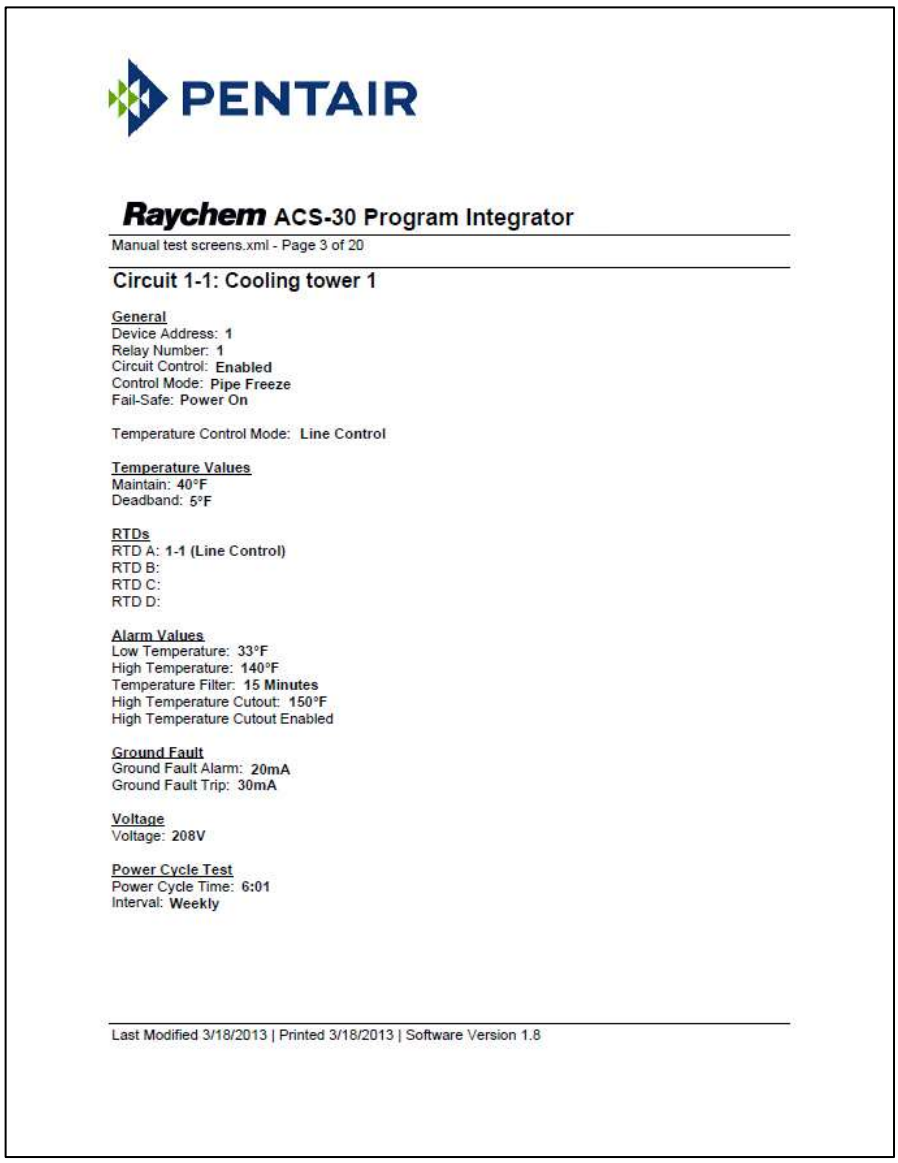
Circuit List Summary

Circuit	ID	Control Mode	Assigned RTDs/EXTs
1-1	Cooling tower 1	Pipe Freeze	1-1
1-2	Cooling tower 2	Pipe Freeze	None
1-3	Cooling Tower 3	Pipe Freeze	None
1-4	Hot water west wing	HWAT	1-4
1-5	Hot water east wing	HWAT	None
2-1	Lobby floor	Floor Heating	2-1, 2-2, 2-3
2-2	Lobby Floor 2	Floor Heating	2-2, 2-1, 2-3e
2-3	Floor override	Unassigned	2-3
2-4	ID 2-4	Unassigned	None
2-5	ID 2-5	Unassigned	None
7-1	Fire Sprinkers	Pipe Freeze	7-1, 7-2
TM-A	ID TM-A	Temp Monitor	None
TM-B	ID TM-B	Temp Monitor	None
TM-C	ID TM-C	Temp Monitor	None
TM-D	ID TM-D	Temp Monitor	None
TM-E	ID TM-E	Temp Monitor	None

Last Modified 3/18/2013 | Printed 3/18/2013 | Software Version 1.8

Figure 22 Example Print-Out



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Circuit 1-1: Cooling tower 1

General
Device Address: **1**
Relay Number: **1**
Circuit Control: **Enabled**
Control Mode: **Pipe Freeze**
Fail-Safe: **Power On**

Temperature Control Mode: **Line Control**

Temperature Values
Maintain: **40°F**
Deadband: **5°F**

RTDs
RTD A: **1-1 (Line Control)**
RTD B:
RTD C:
RTD D:

Alarm Values
Low Temperature: **33°F**
High Temperature: **140°F**
Temperature Filter: **15 Minutes**
High Temperature Cutout: **150°F**
High Temperature Cutout Enabled

Ground Fault
Ground Fault Alarm: **20mA**
Ground Fault Trip: **30mA**

Voltage
Voltage: **208V**

Power Cycle Test
Power Cycle Time: **6:01**
Interval: **Weekly**

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Figure 23 Example Print-Out

Section 5 Transferring the Database using a USB Flash Drive

The ACS-UIT2 is programmed to automatically detect and read a USB flash drive when inserted. To download the XML circuit database file to the ACS-UIT2 using the USB Flash Drive:

1. Save the XML file to a USB flash drive.
2. Insert the USB flash drive into the left side of the ACS-UIT2 as shown in the figure below.

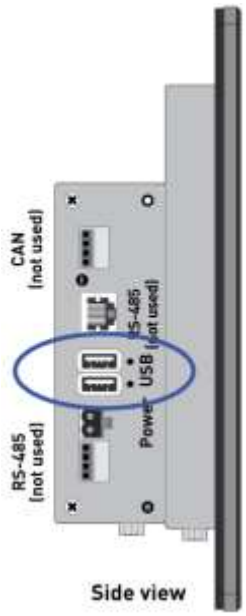

Figure 24 USB port on ACS-UIT2.

The following screen will appear on the ACS-UIT2, click "Select XML database"

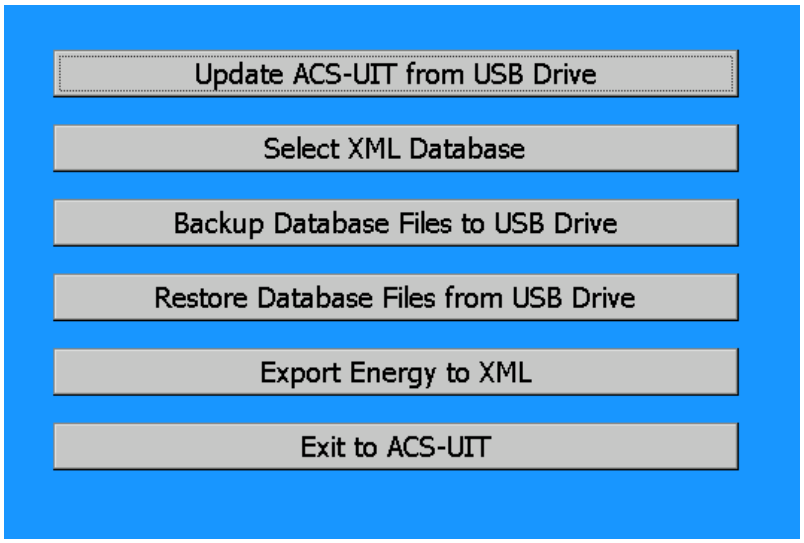
Update ACS-UIT from USB Drive
Select XML Database
Backup Database Files to USB Drive
Restore Database Files from USB Drive
Export Energy to XML
Exit to ACS-UIT

Figure 25 USB Utility Screen

Locate the XML file in the flash drive and tap on the OK button.

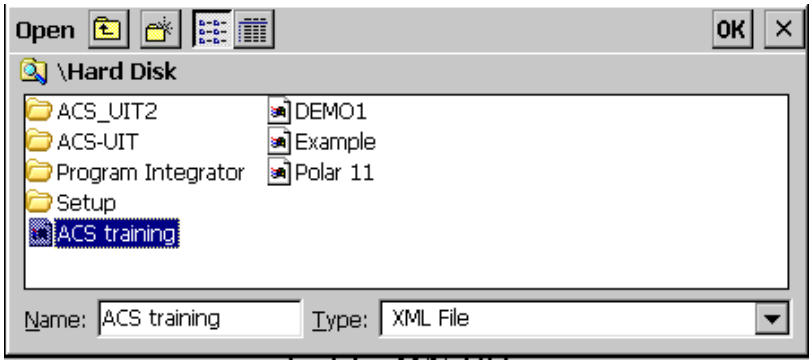

Figure 26 Selecting an XML file

Click OK to overwrite the current database installed on the UIT2.

5.1 Uploading the circuit database to a USB flash drive

The ACS-UIT2 is programmed to automatically detect and read a USB flash drive when inserted. To upload the XML circuit database file to the ACS-UIT2 using the USB Flash Drive:

1. Insert a USB flash drive in the UIT2 as detailed in figure 5.1.
2. Tap the "Backup database files to USB Drive" button.
3. To edit this .XML file, go to File>open. Locate the XML file in the flash drive and tap on the OK button.

Section 6 Importing and Exporting Databases

The main function of this tool is to transmit and receive databases to and from an ACS-UIT2, allowing for easy creation and management of a commercial heat-tracing system. This utility can be accessed by clicking on File > Import and Export.

Once a database has been created, this tool can easily transfer the data to the UIT2. Alternatively, if a database from the UIT2 needs to be backed up or edited, this utility can so retrieve information from the UIT2.

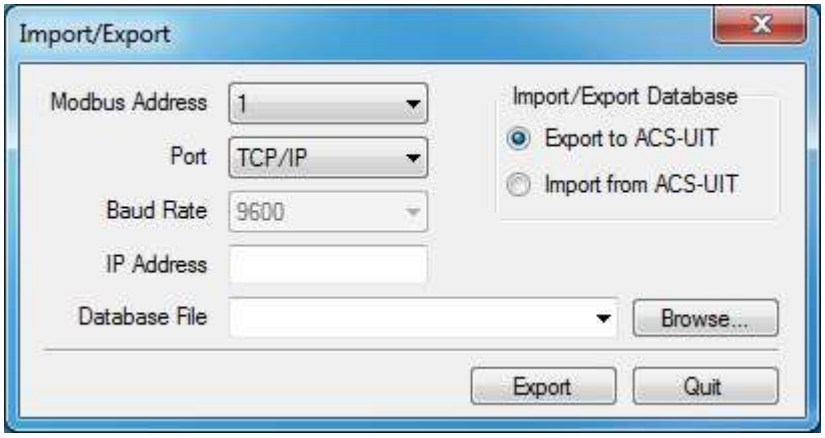

Figure 27 Import/Export Window

Exporting and Importing a Database

1. Select the Modbus® address of the ACS-UIT2 in the Modbus Address drop down menu.
2. Select the desired port to use.
3. If a serial port was selected, select a Baud Rate. This must match the Baud Rate set on the ACS-UIT2 (System|Comm). If TCP/IP was selected as the port, enter the UIT2's IP address, located in System|Comm of the UIT2.
4. Select the database file to either save to or send from.
5. After clicking OK, a status window will give you the status of the database transfer.

Refer to the ACS-UIT2 Installation Instructions (H58239) for further details on connections and input parameters.

Using RS-232 Connection

The RS-232 port can be used as a direct connection to a single PC located within 15 meters (50 feet) of the panel. For an RS-232 connection, a 3-foot long RJ11 to 9-pin female D-connector is provided with the ACS-UIT2. Plug the RJ11 connector into the RS-232 connector on the ACS-UIT2 and the other end into the 9-pin male connector on the user's computer.

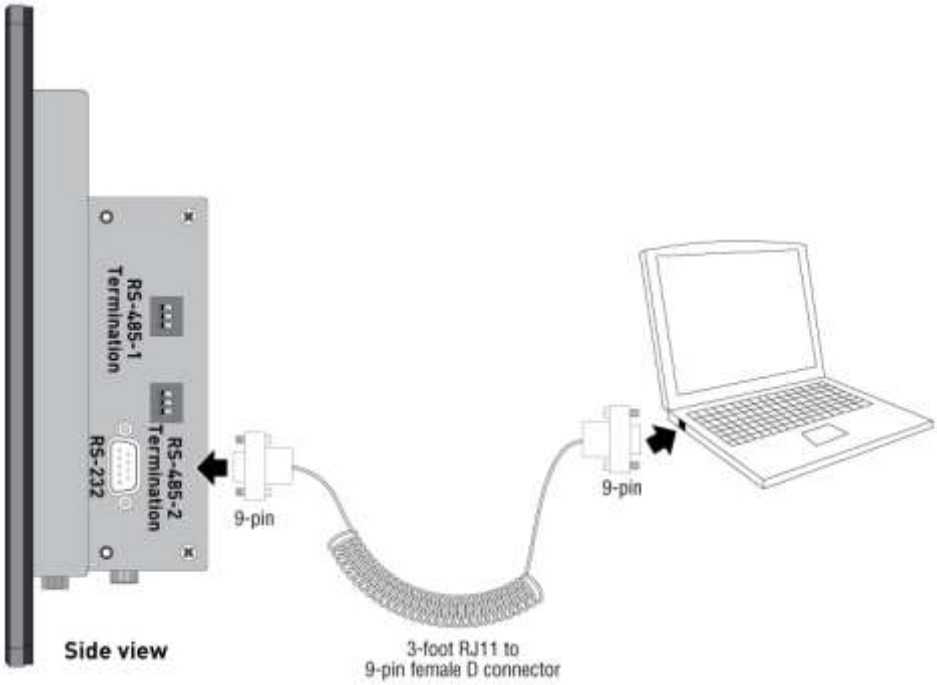

Figure 28 Connection via RS-232

Using RS-485 Connection

Use the RS-485 port when multiple ACS-UIT2 units are to be connected to a host computer or the connection is longer than 15 meters (50 feet). An RS-485 to RS-232 converter may be required to make the connection to the user's PC.

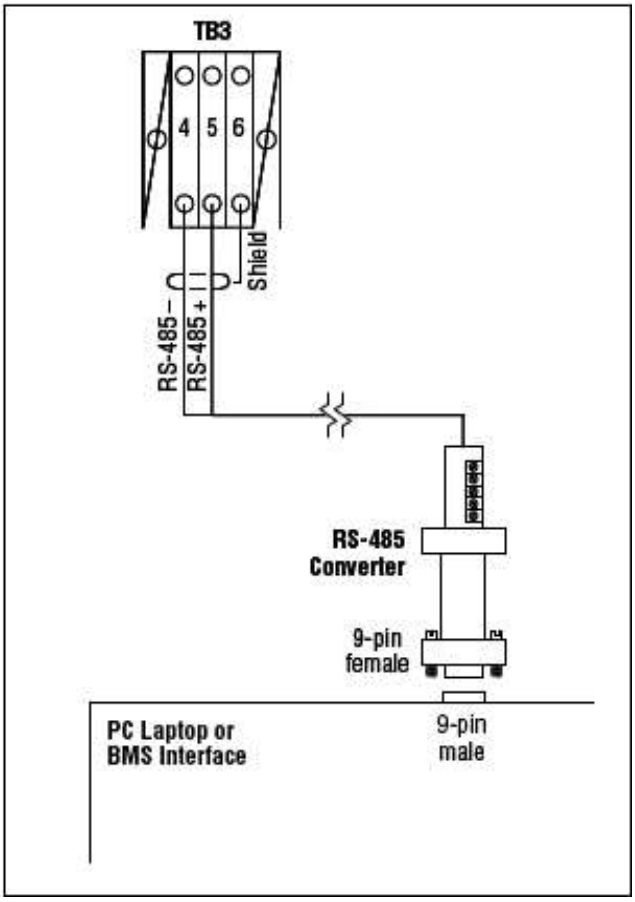

Figure 29 Connecting via RS-485

Using Ethernet Connection

Connect an Ethernet cable from the ACS-UIT2 to a Network node.

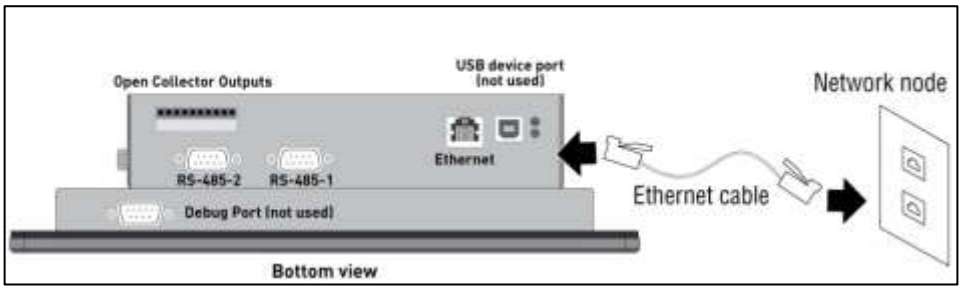

Figure 30 Connecting via Ethernet

Configuring the ACS-UIT2

The ACS-UIT2 must be configured properly to Import and Export XML files. On the UIT2 itself, go to System|Comm screen on the ACS-UIT2 to configure these settings.

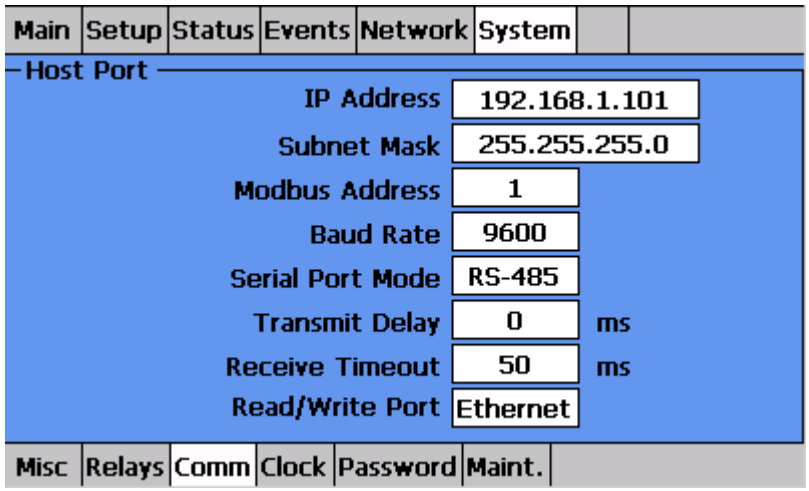

Figure 31 System|Comm Screen

Using RS-232: Change Serial Port Mode on the UIT2 to RS-232 and make sure Read/Write Port is set to Serial.

Using RS-485: Change Serial Port Mode on the UIT2 to RS-485 and make sure Read/Write Port is set to Serial.

Using TCP/IP: Set Read/Write Port to Ethernet and disregard Serial Port Mode on the UIT2.

This screen on the UIT2 will also display the information needed for the Program Integrator (Modbus Address, Baud Rate and IP Address).

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